

**U.S. FISH AND WILDLIFE SERVICE  
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Korthalsella degeneri*

COMMON NAME: Hulumoa

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: August 2005

**STATUS/ACTION:**

☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☒ Non-petitioned

☐ Petitioned - Date petition received: May 11, 2004

☐ 90-day positive - FR date:

☒ 12-month warranted but precluded - FR date: May 11, 2005

☐ Did the petition request a reclassification of a listed species?

**FOR PETITIONED CANDIDATE SPECIES:**

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions. During the past 12 months, most of our national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov>).

☐ Listing priority change

Former LP: ☐

New LP: ☐

Date when the species first became a Candidate (as currently defined): 1999

☐ Candidate removal: Former LP: ☐

☐ A – Taxon is more abundant or widespread than previously believed or not subject to

the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

- \_\_\_ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
- \_\_\_ F – Range is no longer a U.S. territory.
- \_\_\_ I – Insufficient information exists on biological vulnerability and threats to support listing.
- \_\_\_ M – Taxon mistakenly included in past notice of review.
- \_\_\_ N – Taxon does not meet the Act’s definition of “species.”
- \_\_\_ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plants, Viscaceae (Mistletoe family)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Oahu

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Oahu

LAND OWNERSHIP: The population is located on land under the jurisdiction of the U.S. Army, in Makua Valley, in an area operated as a firing range.

LEAD REGION CONTACT: Paul Phifer, 503-872-2823, paul\_phifer@fws.gov

LEAD FIELD OFFICE CONTACT: Pacific Islands Fish and Wildlife Office, Christa Russell, 808-792-9400, christa\_russell@fws.gov

#### BIOLOGICAL INFORMATION:

Species Description *Korthalsella degeneri* is a parasitic subshrub; stems 10-20 centimeters (4-8 inches (in)) long, many branched, cylindrical for 2-3 internodes and similar in width, otherwise flattened throughout, 7-22 millimeters (mm) (0.3-0.9 in) long, and 2-5 mm(0.08-0.2 in) wide. Flower groups are confined to the axils (Wagner *et al.* 1999a).

Taxonomy *Korthalsella degeneri* was described by B.H. Danser. This species is recognized as a distinct taxon in Wagner *et al.* (1999a) and Wagner and Herbst (2003), the most recently accepted Hawaiian plant taxonomy.

Habitat *Korthalsella degeneri* is parasitic on two species of native trees, *Sapindus oahuensis* and *Nestigis sandwicensis*, and is found only in diverse mesic forest at an elevation of 984 feet (300 meters) (Wagner *et al.* 1999a).

Historical and Current Range/Current Status Recent surveys indicate that the species is known only from one population of 1,000 individuals on the island of Oahu, in Makua Valley (Hawaii Natural Heritage Program Database 2004). Native mesic forest communities are increasingly rare and are under constant threat of degradation from development, alien plant species, goats,

and other factors (Marie Bruegmann, U.S. Fish and Wildlife Service (Service), pers. comm. 1997). Prior to human arrival on Oahu, native mesic forests were widespread and abundant and it is assumed that this species was relatively abundant within this habitat type. While we do not know of any surveys or long-term trends since this information was provided, it is reasonable to assume the populations have continued to decline, since not all of the threats are being managed throughout all of its range.

#### THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

All mesic forests on Oahu have been degraded by goats (*Capra hircus*), which threaten the continued existence of this species (Joel Lau, Hawaii Natural Heritage Program; John Obata, private consultant; Winona Char, private consultant; Bill Garnett, private consultant, pers. comms. 1996). The goat, a species originally native to the Middle East and India, was successfully introduced to the Hawaiian Islands in 1792. Currently, populations exist on Kauai, Oahu, Maui, and Hawaii. Goats browse on introduced grasses and native plants, especially in drier and more open ecosystems. Feral goats eat native vegetation, trample roots and seedlings, cause erosion, and promote the invasion of alien plants. They are able to forage in extremely rugged terrain and have a high reproductive capacity (Clarke and Cuddihy 1980; van Riper and van Riper 1982; Scott *et al.* 1986; Tomich 1986; Culliney 1988; Cuddihy and Stone 1990). Goats have been partially fenced out of the habitat where this taxon currently occurs but some are still present.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

None known.

C. Disease or predation.

Because Hawaii's native plants evolved without any browsing or grazing mammals present, many lost natural defenses to such impacts (Carlquist 1980, Lamoureux 1994). Browsing by ungulates has been observed on many other native species, including common and rare or endangered species (Cuddihy and Stone 1990; Loope *et al.* 1991). Therefore, even though we have no evidence of browsing for this species, it is likely that goats impact this species directly as well as their indirect impacts to the surrounding habitat. Goats have been partially fenced out of the habitat where this taxon currently occurs but some are still present.

D. The inadequacy of existing regulatory mechanisms.

Goats are managed in Hawaii as a game animal, but many herds populate inaccessible areas where hunting is difficult, if not impossible, and therefore has little effect on their numbers (Hawaii Heritage Program 1990). Goat hunting is allowed year round or during certain months, depending on the area (Hawaii Department of Land and Natural Resources n.d.-a, n.d.-b, n.d.-c). However, public hunting does not adequately control the number of ungulates to eliminate this threat to native plant species. Goats have been partially fenced out of the habitat where this taxon currently occurs but some are still present.

E. Other natural or manmade factors affecting its continued existence.

Alien plant species are a threat to this species (Hawaii Natural Heritage Program Database 2004

The original native flora of Hawaii consisted of about 1,400 species, nearly 90 percent of which were endemic. Of the total native and naturalized Hawaiian flora of 1,817 taxa, 47 percent were introduced from other parts of the world, and nearly 100 species have become pests (Smith 1985; Wagner *et al.* 1999a). Several studies (Cuddihy and Stone 1990; Wood and Perlman 1997; Robichaux *et al.* 1998) indicate nonnative plant species may outcompete native plants similar to *Korthalsella degeneri*. Competition may be for space, light, water, or nutrients, or there may be a chemical inhibition of other plants (Smith 1985; Cuddihy and Stone 1990). In addition, nonnative pest plants found in habitat similar to that of this species have been shown to make the habitat less suitable for native species (Smathers and Gardner 1978; Smith 1985; Loope and Medeiros 1992; Medeiros *et al.* 1992; Ellshoff *et al.* 1995; Meyer and Florence 1996; Medeiros *et al.* 1997; Loope *et al.* 2004). In particular, alien pest plant species modify habitat by modifying availability of light, altering soil-water regimes, modifying nutrient cycling, or altering fire characteristics of native plant communities (Smith 1985; Cuddihy and Stone 1990; Vitousek *et al.* 1987). Because of demonstrated habitat modification and resource competition by nonnative plant species in habitat similar to habitat of *Korthalsella degeneri*, the Service believes nonnative plant species are a threat to *Korthalsella degeneri*. The remaining unmanaged populations of *Korthalsella degeneri* are still impacted by this threat.

This species is also threatened by fire (J. Lau, J. Obata, W. Char, B. Garnett, pers. comms. 1996). The U.S. Army uses Makua Valley as a firing range and, as a result, fires periodically occur, especially during the dry summer months. Because Hawaiian plants were subjected to fire during their evolution only in areas of volcanic activity and from occasional lightning strikes, they are not adapted to recurring fire regimes and do not quickly recover following a fire. Alien plants are often better adapted to fire than native plant species, and some fire-adapted grasses have become widespread in Hawaii. Native shrubland and dry forest can thus be converted to land dominated by alien grasses. The presence of such species in Hawaiian ecosystems greatly increases the intensity, extent, and frequency of fire, especially during drier months or drought. Fire-adapted alien plant taxa can reestablish in a burned area, resulting in a reduction in the amount of native vegetation after each fire. Fire can destroy dormant seeds as well as plants, even in steep or inaccessible areas. Fires may result from natural causes, or they may be accidentally or purposely started by humans (Cuddihy and Stone 1990, D'Antonio and Vitousek 1992; Friefelder *et al.* 1998). With only one remaining population, the threat from fire and natural events, such as hurricanes and landslides, is very high. The Army has a fire management plan to minimize fire damage to Makua Valley resulting from military activities but the plan does not address the threat of fire from other sources nor is it expected to be completely effective in eliminating the threat of fires caused by military actions.

#### CONSERVATION MEASURES PLANNED OR IMPLEMENTED

The U.S. Army has built a partial fence to exclude goats from Makua Valley but some goats are still present. A fire management plan for Makua Valley has been developed and adopted by the U.S. Army to minimize the effects of fires started as the result of military actions in the valley.

#### SUMMARY OF THREATS:

The major threats to this taxon are goats that degrade and destroy habitat, fire, and nonnative

plants that outcompete and displace native plants, which are believed to be a major cause of the decline of this species throughout its range. Goats have been partially fenced out of the Makua Valley population where *Korthalsella degeneri* currently occurs but some goats are still present. Fires resulting from military activities have been minimized but not completely eliminated. These on-going conservation efforts for this species benefit the known population. The species as a whole is still impacted by these threats and will require long-term monitoring and management to maintain threat free areas.

#### LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
<b>High</b>	<b>Imminent</b>	Monotypic genus	1
		<b>Species</b>	<b>2 *</b>
	Non-imminent	Subspecies/population	3
		Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

#### Rationale for listing priority number:

##### *Magnitude:*

This species is highly threatened by goats that directly prey upon, degrade and destroy habitat, fire, and nonnative plants that outcompete and displace native plants. Threats to lowland diverse mesic forest habitat of *Korthalsella degeneri* occur throughout its range, and are expected to continue or increase without control or eradication. Goats have been partially fenced out of the area in Makua Valley where *Korthalsella degeneri* currently occurs but some goats are still present. Fires resulting from military activities have been minimized but not completely eliminated. The species as a whole is still impacted by these threats and will require long-term monitoring and management to maintain threat free areas.

##### *Imminence:*

Threats to *Korthalsella degeneri* from goats, fire, and nonnative plants are imminent because they are ongoing.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. The species does not appear to be appropriate for emergency listing at this time because the immediacy of the threats is not so great as to imperil a significant proportion of the taxon within the time frame of the routine listing process. In addition, the U.S. Army has excluded goats from portions of Makua Valley through fencing, which will provide protection to individuals of *Korthalsella degeneri*. If it becomes apparent that the routine listing process is not sufficient to prevent large losses that may result in this species' extinction, then the emergency rule process for this species will be initiated. We will continue to monitor the status of *K. degeneri* as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

#### DESCRIPTION OF MONITORING:

Much of the information in this form is based on the results of a meeting of 20 botanical experts held by the Center for Plant Conservation in December of 1995, and was updated by personal communication with Joel Lau, Hawaii Natural Heritage Program; John Obata, private consultant; Winona Char, private consultant; and Bill Garnett, private consultant, in 1996. We have incorporated additional information on this species from our files and the most recent supplement to the *Manual of the Flowering Plants of Hawaii* (Wagner and Herbst 2003). In 2004, the Pacific Islands office contacted the following species experts: Bob Hobdy, retired from Hawaii Division of Forestry and Wildlife; Joel Lau, Hawaii Natural Heritage Program; Art Medeiros, U.S.G.S. Biological Resources Discipline; Hank Oppenheimer, resource manager for Maui Land and Pineapple Company; and Steve Perlman and Ken Wood, National Tropical Botanical Garden. No new status or range information was provided in 2004. In 2005 we contacted the species experts listed below, but received no new information on this taxon.

The Hawaii Natural Heritage Program identified this species as critically imperiled (Hawaii Natural Heritage Program Database 2004). Based on the International Union for Conservation of Nature and Natural Resources Red Plant Data Book rarity categories, this species is recognized as Rare (could be considered at risk) by Wagner *et al.* (1999b).

Species experts were contacted but did not provide new information this year, no new literature was found, and no known entities are studying this species. However, it is highly likely that the previously reported threats continue to impact the species at the same or an increased level.

#### COORDINATION WITH STATES:

In October 2004 we provided the Hawaii Division of Forestry and Wildlife with copies of our most recent candidate assessments for their review and comment. Vickie Caraway, the State botanist, reviewed the information for this species and provided no additional information or corrections (V. Caraway, pers. comm. 2005).

#### LITERATURE CITED

List all experts contacted:

Name	Date	Place of Employment
1. Joel Lau	June 28, 2005	Hawaii Natural Heritage Program
2. Art Medeiros	June 28, 2005	U.S.G.S. Biological Resources Discipline

3. Jim Jacobi	June 28, 2005	U.S.G.S. Biological Resources Discipline
4. Rick Warshauer	June 28, 2005	U.S.G.S. Biological Resources Discipline
5. Hank Oppenheimer	June 28, 2005	Maui Land and Pineapple Company
6. Kapua Kawelo	June 28, 2005	U.S. Army
7. Dave Lorence	June 28, 2005	National Tropical Botanical Garden
8. Steve Perlman	March 29, 2005	National Tropical Botanical Garden
9. Ken Wood	August 2, 2005	National Tropical Botanical Garden
10. Marie Bruegmann	July 13, 2005	U.S. Fish and Wildlife Service
11. Vickie Caraway	June 14, 2005	Hawaii Division of Forestry and Wildlife

List all databases searched:

Name	Date
1. Hawaii Natural Heritage Program	2004

Other resources utilized:

- Carlquist, S. 1980. Hawaii: A natural history, 2nd edition. Pacific Tropical Botanical Garden, Honolulu. 468 pp.
- Center for Biological Diversity, Dr. Jane Goodall, Dr. E.O. Wilson, Dr. Paul Ehrlich, Dr. John Terborgh, Dr. Niles Eldridge, Dr. Thomas Eisner, Dr. Robert Hass, Barbara Kingsolver, Charles Bowden, Martin Sheen, the Xerces Society, and the Biodiversity Conservation Alliance. 2004. Hawaiian Plants: petitions to list as federally endangered species. May 4, 2004.
- Clarke, G., and L.W. Cuddihy. 1980. A botanical reconnaissance of the Na Pali coast trail: Kee Beach to Kalalau Valley (April 9-11, 1980). Division of Forestry and Wildlife, Department of Land and Natural Resources, Hilo, Hawaii.
- Corn, C.A., G. Clarke, L. Cuddihy, and L. Yoshida. 1979. A botanical reconnaissance of Kalalau, Honopu, Awaawapuhi, Nualolo and Milolii Valleys and shorelines—Na Pali, Kauai. Unpublished report. Division of Forestry and Wildlife, Department of Land and Natural Resources, Endangered Species Program, Honolulu. 14 pp.
- Cuddihy, L.W., and C.P. Stone. 1990. Alteration of native Hawaiian vegetation; effects of humans, their activities and introductions. Coop. Natl. Park Resources Stud. Unit, Hawaii. 138 pp.
- Culliney, J.L. 1988. Islands in a Far Sea; Nature and Man in Hawaii. Sierra Club Books, San Francisco. 410 pp.
- D'Antonio, C.M. and P.M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle and global change. Annual Review of Ecology and Systematics 23: 63-88.
- Ellshoff, Z.E., D.E. Gardner, C. Wikler, and C.W. Smith. 1995. Annotated bibliography of the genus *Psidium*, with emphasis on *P. cattleianum* (strawberry guava) and *P. guajava* (common guava), forest weeds in Hawai'i. Cooperative National Park Resources Studies Unit, University of Hawaii. Technical Report 95.
- Friefelder, R.R., P.M. Vitousek, and C.M. D'Antonio. 1998. Microclimate change and effect on fire following forest-grass conversion in seasonally dry tropical woodland. Biotropica 30: 286-297.
- Lamoureux, C.H. 1994. Conserving Hawaiian biodiversity – the role of Hawaiian botanical

- gardens. Pp. 55-57. In: C.-I Peng and C.H. Chou (eds.). Biodiversity and Terrestrial Ecosystems. Institute of Botany, Academia Sinica Monograph Series No. 14.
- Loope, L.L., A.C. Medeiros, and B.H. Gagné. 1991. Recovery of Vegetation of a montane bog following protection from feral pig rooting. Coop. Natl. Park Resources Studies Unit, Univ. Hawaii/Manoa, Dept. Of Botany, Tech. Rept. 77.
- Loope, L.L. and A.C. Medeiros. 1992. A new and invasive grass on Maui. Newsletter of the Hawaiian Botanical Society 31: 7-8.
- Loope, L., F. Starr and K. Starr. 2004. Management and research for protecting endangered Hawaiian plant species from displacement by invasive plants on Maui, Hawaii. Weed Technology 18: 1472-1474.
- Medeiros, A.C., L.L. Loope, P. Conant and S. McElvaney. 1997. Status, ecology, and management of the invasive plant, *Miconia calvescens* DC (Melastomataceae) in the Hawaiian Islands. Bishop Mus. Occas. Pap. 48: 23-36.
- Medeiros, A.C., L.L. Loope, T. Flynn, S.J. Anderson, L.W. Cuddihy, and K.A. Wilson. 1992. Notes on the status of an invasive Australian tree fern (*Cyathea cooperi*) in Hawaiian rain forests. American Fern Journal 82: 27-33.
- Robichaux, R., J. Canfield, F. R. Warshauer, L. Perry, M. Bruegmann, and G. Carr. 1998. Adaptive Radiation. Endangered Species Bulletin. November/December.
- Scott, J.M., S. Mountainspring, F.L. Ramsey, and C.B. Kepler. 1986. Forest bird communities of the Hawaiian Islands: Their dynamics, ecology, and conservation. Studies in Avian Biology 9: 1-429. Cooper Ornithological Society, Los Angeles.
- Smathers, G.A. and D.E. Gardner. 1978. Stand analysis of an invading firetree (*Myrica faya* Aiton) population, Hawai'i. Proceeding of the Second Conference on Natural Science, Hawaii Volcanoes National Park, pp. 274-288.
- Smith, C.W. 1985. Impact of alien plants on Hawai'i's native biota: in Stone, C.P., and J.M. Scott (eds.), Hawai'i's Terrestrial Ecosystems: Preservation and Management. Coop. Natl. Park Resources Stud. Unit, Univ. Hawaii, Honolulu, pp. 180-250.
- Vitousek, P.M., C.M. D'Antonio, L.L. Loope, M. Rejmanek, and R. Westerbrooks. 1997. Introduced species: a significant component of human-caused global change. New Zealand Journal of Ecology 21(1): 1-16.
- Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1999a. Manual of the Flowering Plants of Hawai'i. University of Hawaii Press and Bishop Museum Press, Honolulu. Bishop Mus. Spec. Publ. 97: 1-1918.
- Wagner, W.L., M.M. Bruegmann, and J.Q.C. Lau. 1999b. Hawaiian vascular plants at risk: 1999. Bishop Mus. Occas. Pap. 60: 1-58.
- Wagner, W.L. and D.R. Herbst. 2003. Electronic supplement to the manual of flowering plants of Hawai'i, version 3.1. December 12, 2003. Available from the Internet. URL: <http://rathbun.si.edu/botany/pacificislandbiodiversity/hawaiianflora/supplement.htm>.
- Wood, K.R. and S. Perlman. 1997. Maui 14 plant survey final report. Submitted by National Tropical Botanical Garden, October, 1997.



APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all 12-month petition findings, additions of species to the candidate list, removal of candidate species, and listing priority changes.

Approve: **Acting** David W. Winkler 11/10/05  
Regional Director, Fish and Wildlife Service Date

Marshall P. Jones

Concur: \_\_\_\_\_ August 23, 2006  
Director, Fish and Wildlife Service Date

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Date of annual review: September 16, 2005  
Conducted by: Marie M. Brueggmann, Pacific Islands FWO  
Plant Recovery Coordinator

Comments:  
PIFWO Review

Reviewed by: Christa Russell Date: September 23, 2005  
Plant Conservation Program Leader

Gina Shultz Date: October 13, 2005  
Assistant Field Supervisor,  
Endangered Species

Patrick Leonard Date: October 13, 2005  
Field Supervisor